drive, the head element will be exposed to the atmosphere and associated corrosive materials, such as water and corrosive compounds containing sulfur or chlorine that may exist in the local atmosphere. In the case of HSAs that have not been installed, no removal from a device is required. To reduce the corrosion of the head element during rework of the disk drive or HSA, a protective coating can be applied to the slider and head element, thereby providing a new protective coating to the areas of the head element that will have been stripped of the original protective coating during the preliminary testing or use of the disk drive.

By providing a protective coating to the head element during the reworking process, the head element is protected from corrosion, and cost savings are realized in the form of conserved parts, i.e., not having to replace the head element. In addition, future repairs are reduced and extended life is achieved because the heads have been protected from corrosion. Accordingly, cost savings are realized in the form of reduced future repair costs that would be associated with both parts and labor, or premature replacement of the drive. Finally, the potential exists for degraded head performance due to head corrosion from exposure to the atmosphere. By applying a protective coating to the head after disassembling the disk drive, the possibility of sub-optimal performance due to the presence of corrosion on the head element is greatly reduced, if not eliminated.

The protective coating is preferably a thin fluorocarbon polymeric coating. One example is the polymer found in the FC722 solution, produced by 3M®, although the present invention is not limited to this material. Any thickness of coating is preferable over no coating and, therefore, the present invention is not intended to be limited to a specific range of thicknesses. However, good results have been achieved with a

fluorocarbon polymeric coating having a thickness of approximately 250 angstroms, although a thin layer such as a monolayer (a layer having a thickness of one molecule) can provide some level of corrosion protection. As used herein, a thick layer is intended to mean greater than 50 angstroms and a thin layer is intended to mean less than 20 angstroms.

The protective coating is preferably deposited on the head element and the slider using a solvent-mediated deposition process such as spraying, dipping and draining processes. However, other thin film deposition processes are possible, such as a vapor-mediated process. Precursor molecules in the vapor phase may also be deposited by exposing the head element and slider to precursor gases and excitation such as by heat, ultraviolet, infrared, or plasma energy to form the protective coating. Alternatively, vacuum processes can be used to apply the protective polymer coating.

Cleaning of the head element can be optionally performed before the protective coating is applied. This cleaning will help remove debris that is attached to the head stack assembly. Otherwise, the coating process may trap debris on the head stack assembly.

For optimum corrosion protection, the coating should be applied as thick as possible, preferably greater than 50 angstroms. Because corrosion is proportioned to the permeability of the protective coating, a thicker coating is preferred for longer protection. Nevertheless, it should be understood that different compositions have different permeabilities and, therefore, different coatings of the same thickness may have different permeabilities. Moreover, increased corrosion protection may also be obtained by post-processing of the polymeric film protective coating. By exposing the deposited film to

infrared, ultraviolet, plasma, or other forms of energy that cause the polymer to cross-link and remove water, thereby providing increased corrosion protection.

As previously stated, the protective coating should be applied as thick as possible for optimum corrosion protection. However, it may advantageous to remove the protective polymer film or reduce the thickness of the film prior to installing the head into the disk drive. The inventors have determined that solvent cleaning processes can be used to remove all of the protective polymer film or remove all but approximately less than 20 angstroms of the protective coating. Cleaning the protective polymer coated head with a solvent cleaning process using a non-polar solvent (for example, hydrofluoroethers) can produce a head with the thin film remaining on the head. Moreover, and as an additional benefit of this invention, the remaining thin layer of a fluorocarbon protective coating will act to reduce the surface energy of the slider, thereby also inhibiting chemicals and debris from sticking to the slider.

The protective coating can also be used to protect heads that are being stored and/or shipped and are awaiting assembly into a disk drive, or are for some other reason not installed in the protective environment of a closed disk drive housing

In summary, a typical disk drive includes a housing, a platter of disks for the storage of information, actuator arm assemblies with read/write head elements located at the distal end, and some means for transmitting information from the computer processor to the head, such as a ribbon or flux circuit. When re-opened for purposes of performing rework, the invention consists of a layer of protective coating applied to the head element, thereby substantially reducing corrosion of the sensitive head read/write surfaces during the period of rework. In addition, utilization of a layer of protective